

## Psychological characteristics of adolescent suicide attempters presenting to a pediatric emergency service

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**Aim:** To determine the sociodemographic and behavioral characteristics of adolescents who attempt suicide and evaluate them by different scales.

**Materials and methods:** The study was conducted with 116 adolescent suicide attempters and 98 age-matched healthy controls.

**Results:** The mean age of all adolescents was  $13.8 \pm 1.2$  years, with ages ranging from 11 to 16 years. Of these adolescents, 82.7% were girls. The total Suicide Probability Scale score was negatively correlated with the total Reasons for Living Inventory ( $r = -0.42$ ,  $P = 0.001$ ) and positively correlated with the Problem Solving Inventory score, which is indicative of low problem-solving capabilities ( $r = 0.46$ ,  $P = 0.001$ ). Logistic regression analysis showed that higher suicidal probability scores among adolescents were associated with previous suicide attempts ( $P = 0.01$ , OR = 2.0, CI 95%: 1.0-3.5).

**Conclusion:** The greater the Suicide Probability Scale score, the higher the probability of suicide and the lower the problem-solving capability. It is possible that having had a previous suicide attempt is the most important risk factor for a future suicide attempt. Cooperation among family, school, and psychological professionals may help reduce the attempted suicide rate, especially among female adolescents.

**Key words:** Adolescent, suicidal attempt, precipitating factors, scales

### Çocuk acil servisine başvuran özkıyım girişiminde bulunan ergenlerin psikolojik özellikleri

**Amaç:** Özkıyım girişiminde bulunan ergenlerin sosyodemografik ve davranışsal özelliklerinin belirlenmesi ile birlikte farklı ölçeklerle değerlendirilmeleri amaçlandı.

**Yöntem ve gereç:** Çalışma özkıyım girişiminde bulunan 116 ergen ve benzer yaşta 98 sağlıklı denek üzerinde yapıldı.

**Bulgular:** Tüm ergenlerin ortalama yaşı  $13,8 \pm 1,2$  yıl olup yaş aralığı 11-16 yıl arasında idi. Olguların % 82,7'si kız idi. İntihar Olasılığı Ölçeği skoru ile Yaşamı Sürdürme Nedenleri envantari arasında olumsuz yönde ( $r = -0,42$ ;  $P = 0,001$ ), problem çözme yeteneği düşüklüğünün göstergesi olarak Problem Çözme Envanteri arasında ise olumlu yönde bir ilişki vardı ( $r = 0,46$ ,  $P = 0,001$ ). Logistik regresyon analizinde daha önce özkıyım girişiminde bulunulmasının İntihar Olasılığı Ölçeği skorunu artırdığı gösterildi ( $P = 0,01$ ; OR = 2,0; CI % 95: 1,0-3,5).

**Sonuç:** İntihar olasılığı Ölçeği skoru arttıkça intihar olasılığı artmakta ve problem çözme yeteneği azalmaktadır. Bir sonraki özkıyım girişimi için en önemli hazırlayıcı etmen daha önce özkıyım girişiminde bulunulmasıdır. Aile, okul ve psikoloji uzmanları arasındaki iletişim özellikle kız ergenler arasında özkıyım girişimini azaltmaya yardımcı olabilir.

**Anahtar sözcükler:** Ergen, özkıyım girişimi, hazırlayıcı etmenler, ölçekler

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## Introduction

Attempted suicide, as currently conceptualized, is a conflict, a neuropsychiatric condition, a physical illness, and a potentially self-injurious action with a nonfatal outcome (1). This voluntary attempt at taking one's own life is a tragedy, especially for those who are young.

The World Health Organization (WHO) reports that in 2000 more than 800,000 people died from suicide around the world (2). The reported annual incidence of suicide in Turkey was 3.98 in 100,000 in 2003 (3). A comment about the probable accuracy of this figure is warranted. There are substantial Islamic and Eastern Orthodox populations in Turkey. Both hold strong prohibitions against suicide. Suicidal behavior has been identified as a serious public health problem worldwide, but the topic has yet to be seriously studied among Turkish youths (4). Across different cultures, the prevalence of nonfatal suicidal attempts has been found to be alarmingly high among adolescents. Lifetime suicidal ideation rates have ranged from 20% to 54%, and lifetime suicide attempt rates generally lie between 7% and 10%, with some studies showing rates of up to 15% (5). Youth suicide is the third leading cause of death among North Americans (6) and accounts for over a fifth of all deaths of young people in the United Kingdom (7). In Taiwan, suicide was the second most common cause of death of youths at 6.21 in 100,000 (8).

Some studies have also shown that the suicide rate is high among adolescents in Turkey (9,10). A pressing need exists for systematic information identifying the characteristics of adolescents who attempt suicide, and the results of this study have vital importance for understanding suicidal behavior in adolescents.

Several scales are frequently used to evaluate suicidal behavior among adolescents (11-13). To the best of our knowledge, no previous study has assessed suicidal behavior by comparing the Suicide Probability Scale (SPS) with the Reasons for Living Inventory (RFLI), the Interpersonal Relationship Scale (IRS), or the Problem Solving Inventory (PSI).

The first aim of this study was to ascertain the sociodemographic and psychosocial characteristics of

adolescents who attempted suicide and presented to a pediatric emergency room in Turkey. The second aim was to compare the characteristics of adolescents who attempted suicide using the SPS, RFLI, IRS, and PSI.

## Materials and methods

A total of 136 adolescent suicide attempters between ages 11 and 16 were hospitalized at the Pediatric Emergency Service between November 2005 and September 2007. All subjects and parents were informed about the study and the 116 subjects who accepted participation were enrolled in the study with a refusal rate of 14.7%. As the control group, 98 age-matched adolescents who presented to the Emergency Service in the same period were also randomly selected. They were asked to participate in the study after they felt well enough to complete a questionnaire. The exclusion criteria were unconsciousness, respiratory and cardio-vascular instability, and mental retardation. All subjects were assessed by the same pediatrician and psychologist. A suicide attempt was defined as any physically self-destructive act of a patient associated with the idea of terminating one's life. Self-poisoning is defined as the intentional self-administration of more than the prescribed dose of any drug and includes poisoning with non-ingestible substances (14). During an interview, adolescents who agreed to participate filled in a questionnaire that contained questions about their sociodemographics, clinical features, and suicidal behavior. The assessment instruments were the SPS, RFLI, IRS, and PSI.

### Sociodemographic and clinical characteristics

Participants were asked about their age, gender, education level, overcrowded housing, socioeconomic level, smoking, and illegal substance use.

Information about previous suicide attempts, family history of suicide, psychiatric disorders, internal family problems, precipitating factors, and suicide methods was obtained by parental interviews.

All subjects reported about their parents' ages, education levels, family structure, occupations, heavy alcohol use, and psychiatric disorders.

Education level was classified according to the following scheme: no school education = illiterate; less than 8 years of primary education = primary school; high school degree = high school; university education = university.

Overcrowded housing was defined as living with more than 4 family members.

To measure socioeconomic status, respondents reported the total household income per month. Income classification was determined in relation to the poverty threshold of 429 YTL (\$346) for a family with 2 children, according to the Turkish Statistical Institute, 2004 (<http://www.tuik.gov.tr>). Income was classified according to the following scheme: below the poverty threshold = low; less than 2 times the poverty threshold = medium; higher than 2 times the poverty threshold = high.

Family structure was defined on the basis of the adolescent's report: together = both parents living together with adolescent; divorced = the parents were divorced; mother or father died = one of them died.

The adolescents were asked about sexual assault. However, no adolescents answered this question.

A heavy alcohol user was defined as consuming 5 or more drinks on the same occasion on each of 5 or more days in the past 30 days.

Psychiatric disorders that had been previously diagnosed by a psychiatrist were recorded. Knowledge about the psychiatric disorders or physical illnesses of the adolescents and parents was recorded as reported by the parents.

## Scales

### Suicide Probability Scale (SPS)

The SPS is a 36-item self-report measure that assesses suicide risk in adults and adolescents. Individuals are asked to rate the frequency of their subjective experiences and past behaviors using a 4-point Likert scale ranging from "None (1)" to "all of the time (4)" (in total, 36-144 possible points). This scale was developed by Cull and Gill (13) in order to evaluate suicide risks in adolescents and adults. Higher points indicate higher risks. It has been shown to be valid and reliable in Turkey by Tuğcu (16). This scale is also one of the few that have adequate psychometric characteristics (17).

In the validation sample of adolescents and adults, internal consistency was determined separately for even and odd items and for each subscale: Total Scale alpha = 0.93 and 0.93; Hopelessness Scale alpha = 0.85 and 0.86; Suicidal Ideation Scale alpha = 0.89 and 0.89; Negative Self-Evaluation Scale alpha = 0.68 and 0.62; Hostility Scale alpha = 0.76 and 0.75 (15). In a high school sample, internal consistency was as follows: Total Scale alpha = 0.90; Hopelessness Scale alpha = 0.78; Suicidal Ideation Scale alpha = 0.86; Negative Self-Evaluation Scale alpha = 0.59; Hostility Scale alpha = 0.66 (11). The greater the score, the higher the probability of suicide.

### Reasons for Living Inventory (RFLI)

The RFLI was developed by Linehan et al. in order to determine positive and negative reasons for avoiding suicidal behaviors (18). It depends on self-reporting. In a study comparing 20 different scales of evaluation of suicidal behaviors, the RFLI has been found to be one of the few that had adequate psychometric characteristics for both patients and normal individuals (17).

In our study, we used a culturally adapted RFLI that included 28 questions (12-19). Durak et al. showed that the RFLI is valid and reliable for Turkey (12). Points were given in the Likert style with between 1 and 6 points possible for each question (in total, 28-168 possible points).

The RFLI consists of 4 subscales and a total scale. The subscales include: Survival and Coping Beliefs, Responsibility and Love versus Family and Friends, Moral and Religious Obstacles, and Fear of Death.

The RFLI has high internal reliability with Cronbach's alpha coefficients ranging from 0.72 to 0.92 for each subscale, and 0.89 for the RFLI total score (18). While SPS scores increase, RFLI scores decrease.

### Interpersonal Relationship Scale (IRS)

The IRS was developed by Lorr and Knight (20). It is a 31-item self-reported measure that assesses interpersonal relations. Points were given in the Likert style with between 0 and 3 points possible for each question (in total, 0-93 points possible). Şahin et al. showed that the IRS is valid and reliable for Turkey (21).

Single number items encode the “nourishing” subscale; double number items encode the “emotionally toxic” subscales. In research on the validity and reliability of the scale, Cronbach’s alpha coefficient was found to be 0.70; for the nourishing subscale, 0.71; for the emotionally toxic subscale, 0.69. The split-half reliability of the 2 subscales was 0.63 (21).

High numbers of points were evaluated as indicators of interpersonal “nourishing” or “emotionally toxic” styles.

### **Problem Solving Inventory (PSI)**

To assess problem-solving ability, the 32-item PSI, developed by Heppner and Petersen (22) (1982) and adapted into Turkish by Şahin et al. (23), was used. Participants assessed each item on a 6-item Likert-type scale (1-6, strongly agree to strongly disagree). Therefore, the possible total scale of scores ranges from 32 to 192. In a reliability and validity study conducted with university students, Şahin et al. (23) found the internal consistency of the scale to be 0.88.

The PSI is designed to assess an individual’s perceptions of his or her capabilities with regards to problem-solving behaviors and attitudes. High scores from the scale show that the subject does not trust his or her problem-solving ability.

### **Procedure**

The scales defined above were shuffled randomly following a demographics sheet and a battery was formed. These batteries were given to subjects individually. Subjects were briefly informed about the objective of the study. Voluntary participation was a must. Total performance duration ranged between 20 and 30 min.

Approval from the Ethics Committee of the Ankara Training and Research Hospital was obtained.

### **Statistical analysis**

The Statistical Package for the Social Sciences (SPSS), version 15.0, was used to perform the statistical analysis. We obtained frequency distributions and cross tabulations of variables of interest.

The necessary instructions required to fill out the questionnaires were given and then the questionnaires were distributed to the adolescents. Mean values with standard deviations were calculated. Data were

analyzed using Student’s t-test or chi-square tests, as appropriate. Scales were correlated with Pearson’s test. Logistic regression analysis was used to determine the risk factors associated with high suicide probability scores. The effect of independent variants on dependent variants was evaluated with an enter method. The Kolmogorov-Smirnov test was used to define normal distribution. The level of statistical significance was accepted as  $P < 0.05$ , 2-tailed.

### **Results**

Demographic and clinical characteristics of all adolescents and parents can be seen in Tables 1 and 2.

#### **Adolescents**

A total of 214 adolescents were evaluated. The mean age was  $13.8 \pm 1.2$  years, with a range of 11 to 16 years. Among suicide attempters, 63.6% were younger than 15 years and female adolescents made up the greater majority of the subjects (87.1%). In total, 68.1% of the adolescents were primary school students, and approximately half of the subjects (52.6%) were living in overcrowded families.

The adolescent smoking rate was not different between the study and control groups and was not related to socioeconomic level. However, living together with both parents was a preventive factor for smoking ( $P = 0.001$ ,  $OR=0.1$ ,  $CI\ 95\%: 0.04-0.2$ ). In the suicidal attempt group, the previous suicide attempt and family history of suicide rates were higher than those of the control group ( $P = 0.001$  and  $P = 0.009$ , respectively). Psychiatric disorders were also more common in the study group ( $P = 0.02$ ). Internal family problems were reported by 54.3% of study subjects ( $P = 0.001$ ). When precipitating factors were evaluated, in the study group, the most commonly reported cause of suicide attempts was parent-adolescent conflicts (56.9%), with other stressors including school problems (19.8%), a break-up with a boyfriend or girlfriend (9.5%), and fights with friends (8.6%).

The most common attempted suicide method was drug overdose (97.4%), while the most commonly preferred drugs were analgesics and antiinflammatory drugs. Three adolescents (2.6%) ingested a toxic substance, including rat poison ( $n = 2$ ) and organophosphate ( $n = 1$ ). None of the subjects died due to their suicide attempt.

Table 1. Demographic and clinical characteristics of all adolescents.

	Suicidal attempt group n = 116	Control group n = 98	P-value
Age (mean ± SD)	13.8 ± 1.1	13.7 ± 1.2	0.53
<b>Gender</b>			
<i>Female</i>	101	76	0.09
<i>Male</i>	15	22	
<b>Education level</b>			
<i>Primary school</i>	79	68	0.84
<i>High school</i>	37	30	
<b>Overcrowded housing (&gt;4 family members)</b>			
<i>Yes</i>	55	41	0.41
<i>No</i>	61	57	
<b>Socioeconomic level</b>			
<i>Low</i>	40	43	0.08
<i>Medium</i>	69	53	
<i>High</i>	7	2	
<b>Smoking</b>			
<i>Yes</i>	10	11	0.68
<i>No</i>	106	87	
<b>Misuse of substances</b>			
<i>Yes</i>	3	0	0.15
<i>No</i>	113	98	
<b>Previous suicide attempt</b>			
<i>Yes</i>	17	2	0.001
<i>No</i>	99	96	
<b>Family history of suicide</b>			
<i>Yes</i>	16	7	0.009
<i>No</i>	63	91	
<b>Psychiatric disorder</b>			
<i>No</i>	91	92	0.02
<i>Depression</i>	12	2	
<i>Attention deficit</i>	8	4	
<i>Mood disorder</i>	5	0	
<b>Internal family problems</b>			
<i>No</i>	53	74	3
<i>Severe incompatibility</i>	44	21	
<i>Violence</i>		19	
0.001			
<b>Precipitating factor</b>			
<i>Parent-adolescent conflict</i>	66	10	0.001
<i>School problems</i>	23	2	
<i>Break-up with a boy/girl friend</i>	11	1	
<i>Fight with a friend</i>	10	0	
<i>Parental divorce</i>	4	4	
<i>Family financial problem</i>	2	2	

Table 2. Demographic and clinical characteristics of the parents.

	<b>Suicidal attempt group</b> Mothers: n = 116 Fathers: n = 116	<b>Control group</b> Mothers: n = 98 Fathers: n = 98	<b>P-value</b>
<b>Mean age (mean ± SD)</b>			
<i>Mother</i>	37.1 ± 5.0	36.4 ± 5.3	0.34
<i>Father</i>	41.3 ± 5.3	41.5 ± 5.6	0.79
<b>Education level</b>			
<i>Mother</i>	3	4	
<i>Illiterate</i>	99	84	
<i>Primary school</i>	12	10	
<i>High School</i>	2	0	0.91
<i>University</i>			
<i>Father</i>			
<i>Primary school</i>	81	73	
<i>High School</i>	30	22	
<i>University</i>	5	3	0.42
<b>Family structure</b>			
<i>Together</i>	99	83	
<i>Divorced</i>	14	14	
<i>Mother or father died</i>	3	1	0.87
<b>Occupation</b>			
<i>Mother</i>			
<i>Housewife</i>	95	78	
<i>Worker</i>	19	19	
<i>Government employee</i>	2	1	0.79
<i>Father</i>			
<i>Small shop owner</i>	61	54	
<i>Worker</i>	34	35	
<i>Government employee</i>	17	7	
<i>Unemployed</i>	4	2	0.88
<b>Misuse of Alcohol</b>			
<i>Mother</i>			
<i>Yes</i>	1	1	
<i>No</i>	115	97	0.70
<i>Father</i>			
<i>Yes</i>	22	8	
<i>No</i>	94	90	0.03
<b>Psychiatric disorder/ physical illness</b>			
<i>Mother</i>			
<i>No</i>	100	93	
<i>Depression</i>	10	2	
<i>Mood disorder</i>	2	0	
<i>Schizophrenia</i>	1	0	
<i>Chronic disease</i>	3	3	0.06
<i>Father</i>			
<i>No</i>	111	96	
<i>Depression</i>	1	0	
<i>Mood disorder</i>	1	0	
<i>Schizophrenia</i>	2	0	
<i>Chronic disease</i>	1	2	

## Parents

All of the adolescents ( $n = 214$ ) responded to the questions about their parents. The mean ages of the subjects' mothers and fathers were  $36.7 \pm 5.0$  and  $41.4 \pm 5.4$  years, respectively. Most of the parents had graduated from primary school. Among all adolescents, 182 (85.0%) were living together with both their mothers and fathers. Twenty-eight (13.1%) of the parents had divorced and 4 (1.9%) had died. Of the mothers, 173 (80.8%) were housewives, and 69 (32.2%) of the fathers were workers. In the study group, 22 (19%) of the fathers were heavy alcohol users ( $P = 0.03$ ). No significant association was detected between alcohol use and socioeconomic level among fathers ( $P = 0.48$ ).

## Scales

The subscales and total scores of the SPS, RFLI, IRS, and PSI are shown in Table 3. The correlation coefficient scores among the SPS, RFLI, IRS, and PSI scales are presented in Table 4. The scatter plots of the SPS with the RFLI and the PSI are shown in Figures 1

and 2. There were significant correlations and it is clear that the scores have a marked scatter.

While the total SPS score was correlated with the IRS subscales, we observed that the SPS was negatively correlated with the "nourishing" subscale ( $r = -0.44$ ,  $P = 0.001$ ) and positively correlated with the "emotionally toxic subscale" ( $r = 0.42$ ,  $P = 0.001$ ).

As shown in Table 4, significant correlations existed among the subscale scores of the SPS, RFLI, and PSI, which ranged between  $-0.16$  and  $0.48$  ( $P < 0.05$ ). In line with our expectations, the results showed that, as the probability of suicide increases, reasons for living and problem-solving skills decrease.

To identify the variables that affect suicide probability, regression analysis was performed. The classification of "high" and "low" suicide probability categories was based upon the median score (median = 86.0) among adolescents. Logistic regression analysis showed that higher suicidal probability scores among adolescents were associated with having had a previous suicide attempt ( $P = 0.01$ ,  $OR = 2.0$ ,  $CI 95\%: 1.0-3.5$ ; Table 5).

Table 3. Subscales and total scores of the Suicide Probability Scale (SPS), Reasons for Living Inventory (RFLI), Interpersonal Relationship Scale (IRS), and Problem Solving Inventory (PSI).

	Suicidal attempt group n = 116 (median min-max)	Control group n = 98 (median min-max)	P-value
<b>SPS</b>			
Hopelessness	28 (12-45)	25 (10-42)	0.001
Suicidal ideation	19 (8-32)	14 (3-26)	0.001
Negative self-evaluation	22 (10-36)	18 (6-34)	0.001
Hostility	15 (7-28)	14 (6-27)	0.08
Total score	85 (44-138)	71 (32-112)	0.001
<b>RFLI</b>			
Survival and coping beliefs	24 (8-46)	26 (9-49)	0.56
Responsibility and love versus family and friends	28 (9-52)	33 (10-59)	0.01
Moral and religious obstacles	20 (6-33)	25 (9-40)	0.001
Fear of death	6 (2-12)	11 (3-21)	0.00
Total score	77 (29-138)	96 (37-167)	0.001
<b>IRS</b>			
Nourishing	27 (5-43)	36 (15-51)	0.001
Emotionally toxic	14 (0-39)	12 (1-37)	0.01
Total score	41 (12-73)	49 (18-79)	0.001
<b>PSI</b>			
Total Score	109 (57-170)	100 (70-159)	0.001

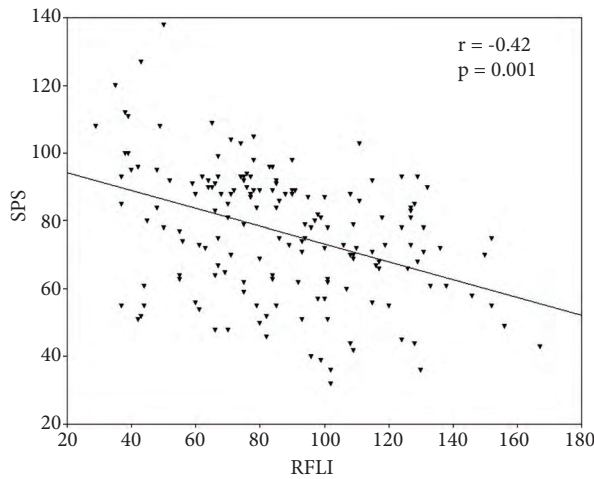


Figure 1. Scatter plot of the correlation between the Suicide Probability Scale (SPS) and the Reasons for Living Inventory (RFLI).

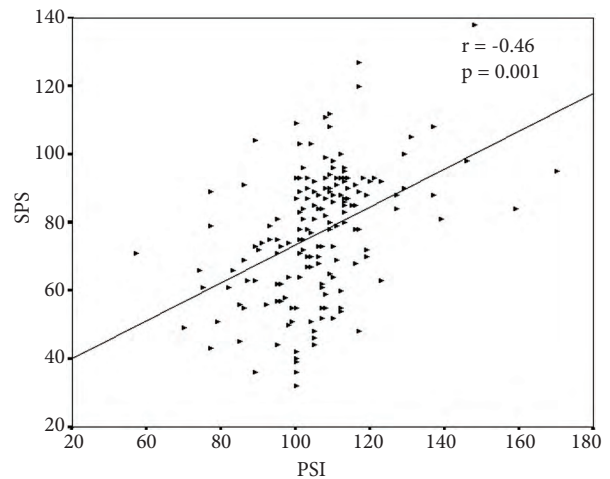


Figure 2. Scatter plot of the correlation between the Suicide Probability Scale (SPS) and the Problem Solving Inventory (PSI).

Table 4. Correlations between the Suicide Probability Scale (SPS) and Reasons for Living Inventory (RFLI), Interpersonal Relationship Scale (IRS), and Problem Solving Inventory (PSI) scales in all adolescents.

	SPS				
	Hopelessness	Suicidal ideation	Negative self-evaluation	Hostility	Total score
<b>RFLI</b>					
<i>Survival and coping beliefs</i>	-0.35*	-0.11	-0.40*	-0.38*	-0.38*
<i>Responsibility and love versus family and friends</i>	-0.40*	-0.11	-0.48*	-0.43*	-0.44*
<i>Moral and religious obstacles</i>	-0.11	-0.16*	-0.40*	-0.22*	-0.26*
<i>Fear of death</i>	-0.15*	-0.24*	-0.38*	-0.21*	-0.29*
Total score	-0.33*	-0.16*	-0.49*	-0.39*	-0.42*
<b>IRS</b>					
<i>Nourishing</i>	-0.28*	-0.42*	-0.46*	-0.26*	-0.44*
<i>Emotionally toxic</i>	-0.38*	-0.38*	0.26	0.34	0.42*
Total score	0.02	-0.08	-0.19*	0.01	-0.06
<b>PSI</b>					
Total score	0.32*	0.32*	0.45*	0.42*	0.46*

\*P < 0.05

**Discussion**

This paper presents the virtue of coming from Turkey, a country which is in the process of entering the “globalization” of the psychiatric community.

We provided data on characteristics of adolescents who attempted suicide and who were treated at a tertiary hospital in Turkey. Our study was cross-sectional in design, and information was collected through self-report questionnaires. The suicidal

behavior of the subjects was evaluated using 4 different scales.

*Age and gender*

Adolescence is a period of rapid biological, psychological, and social change, a time during which major psychiatric disorders begin to bloom. An increasing drive for individualization, a weakening of the support system, and an insecure sense of identity may lead to an increased risk of suicide (24).



Table 5. Characteristics associated with high suicide probability scores in adolescents.

	Total SPS score ≤86 (n = 142)	Total SPS score > 87 (n = 72)	P-value	OR	CI 95% Lower- upper limits
Age (mean ± SD)	13.8 ± 1.1	13.8 ± 1.2	0.62	0.9	0.6-1.3
Gender	114 (80.3)	63 (87.5)			
<i>Female</i>					
<i>Male</i>	28 (19.7)	9 (12.5)	0.16	1.3	0.8-2.1
Education level					
<i>Primary school</i>	100 (70.4)	47 (65.3)			
<i>High school</i>	42 (29.6)	25 (34.7)	0.62	0.9	0.5-1.4
Overcrowded housing					
<i>Yes</i>	63 (44.4)	33 (45.8)			
<i>No</i>	79 (55.6)	39 (54.2)	0.61	1.0	0.7-1.5
Low socioeconomic level					
<i>Yes</i>	48 (33.8)	35 (48.6)			
<i>No</i>	94 (66.2)	37 (51.4)	0.11	1.3	0.9-1.8
Family structure					
<i>Together</i>	123 (86.6)	59 (81.9)			
<i>Divorced/died</i>	19 (13.4)	13 (15.3)	0.52	0.7	0.2-1.9
Alcohol abuse in father					
<i>Yes</i>	17 (12.0)	13 (18.1)			
<i>No</i>	125 (88.0)	59 (81.9)	0.33	1.2	0.7-1.9
Incompatibility or violence in family					
<i>Yes</i>	51 (35.9)	36 (50.0)			
<i>No</i>	91 (64.1)	36 (50.0)	0.25	1.2	0.8-1.6
Previous suicide attempt					
<i>Yes</i>	6 (4.2)	13 (18.1)			
<i>No</i>	136 (95.8)	59 (81.9)	0.01	2.0	1.1-3.5
Family history of suicide attempt					
<i>Yes</i>	16 (11.3)	15 (20.8)			
<i>No</i>	126 (88.7)	60 (83.3)	0.40	1.2	0.7-1.9
Disorder in adolescent					
<i>Yes</i>	17 (12.0)	14(19.4)			
<i>No</i>	125 (88.0)	58 (80.6)	0.30	1.2	0.8-1.9
Disorder in parent					
<i>Yes</i>	15(10.6)	12 (16.7)			
<i>No</i>	127 (89.4)	60 (83.3)	0.43	1.2	0.7-1.9

administered questionnaire concerning suicidal behavior, psychopathology, life events, and demographics, with the results indicating that girls were more likely to report suicidal ideation than boys (25).

Goren et al. (26) investigated suicidal behavior among children and adolescents in a province in Turkey and observed that female children and adolescents were more likely to attempt suicide. Similarly, in the current study, we evaluated adolescent suicide attempters and observed that most were female.

#### *Education*

Preventive approaches to suicide have mainly focused on risk evaluation. Studies of Turkish suicide attempters have revealed that lower educational level is a risk factor (27,28), and higher parental education has been reported to be associated with a lower probability of suicide attempts (29). Nonetheless, in another study from China with a greater sample size, the education variable was not found to be related to suicidal thoughts (30). In our study, more than half of the subjects attended primary schools, and most of the parents had low education levels.

#### *Precipitating factors and preventive measures*

Blum et al. (31) investigated adolescent risk behaviors and reported that, when taken together, race/ethnicity, income, and family structure provide only a limited understanding of adolescent risk behaviors. However, in a study in Turkey, the authors reported that an upward trend in suicide attempts might be related to the intense economic difficulties, increasing unemployment, and rapid social change experienced in Turkey in recent years (28). Our present findings revealed that the family's socioeconomic level was low for 34.5% of the study subjects.

Afifi et al. (32) investigated the associations between health risk behaviors and suicidal ideation in adolescents, and reported that damaging property, engaging in sexual intercourse, and smoking cigarettes were statistically associated with suicidal ideation. In another study, Dervic et al. (33) reported that female gender, substance abuse problems, school type, and cigarette smoking were significantly associated with lifetime suicidal ideation among

Viennese high school students. In the current study, only 8.6% of the adolescent suicide attempters reported that they were smokers, and smoking was not related to a high probability of attempting suicide. Substance abuse may be especially important in the development of suicidal and other self-destructive behaviors. Mind-altering substances tend to disinhibit impulsivity and facilitate the expression of suicidal impulses that might otherwise have been contained. In a study by Felts et al. (34) a comparison of mean drug use factor scores revealed that drug use, particularly the use of crack cocaine, was related to increased suicide ideation and behavior. We observed that a low proportion of our subjects were using illegal substances. However, the smoking and substance abuse rates may be underestimated, as adolescents rarely report such behavior even though they might be smokers and drug users.

Arendt et al. (35) investigated the link between parental alcohol use and suicidal behavior. The results indicated that parental alcoholism is significantly related to depression, suicidal ideation, and suicidal behavior after adjusting for a range of possible confounders using logistic regression. Other researchers have found parental alcohol abuse to be one of the important predictors of suicidal ideation in male adolescents (36). In the current study, most of the subjects were female and 19.0% of fathers were alcohol users. Heavy alcohol use by the father was more common in the study group than the control.

It has been well documented that a history of suicide attempts increases the risk for subsequent attempts (14). Wong et al. (37) presented longitudinal data on adolescent suicide attempts in Hong Kong, examining whether the data supported the "crescendo" model to explain repeat suicide attempts. Their findings were consistent with the "crescendo" model, proposing that the risk of repeat attempts is enhanced following a previous suicide attempt. Our study also showed that high suicidal probability scores among adolescents may be associated with having had a previous suicide attempt.

Suicide is known to be a familial behavior. Adoption, twin, and family studies have shown that first-degree relatives of suicide victims and attempters are at a higher risk for suicidal behavior. Many studies have shown an association between death by suicide

of a family member with suicidal behavior and risk behavior in the family (38-41). In our study, the rate of family history of suicidal attempts was higher among the study subjects.

Female gender and sexual abuse are significant predictors of suicide attempts (42). In a recent study, the authors reported that sexual abuse was a powerful traumatic event that could have severe repercussions on an individual, not only in terms of self-harming behavior but also in terms of developing a wide range of maladaptive behaviors in conjunction with self-harm (43). Previous sexual abuse was not reported in our data set, but this may be attributable to the character of Turkish people, who generally do not disclose their previous traumatic events to others. Psychiatrists, pediatricians, and psychologists should actively inquire about these events, especially sexual abuse history.

Early detection of depression among children and adolescents is a common suicide prevention strategy. Having a psychiatric disorder is a predictor of suicide, and depressive disorder has been shown to have a strong association with suicide in many studies (44,45). In this study, the most common diagnosis of those who attempted suicide was depression. Having a psychiatric disorder and a family history of psychiatric disorders was not related to a high suicide probability. However, according to our personal observations, parents hesitate to report their children's psychiatric disorders unless their mental symptoms become very serious, such as manifesting suicidal behavior, violence, or disorganized behavior.

Fleming et al. examined the associations between individual, family, school, and community characteristics and rates of suicide attempts in a national population sample of New Zealand secondary school students. They found family and school environments to be very important in reducing the risk of suicide among this age group (46). In our study population, the most commonly reported precipitating factor for suicide was parent-adolescent conflict.

School is a major part of life during the adolescent period. If adolescents cannot deal with the many stresses of school, such as academic performance and interpersonal problems, they may become frustrated

and helpless, which may lead to suicide. Thus, school-based screening for child and adolescent suicide ideation is the most important strategy in many countries (47,48). Gould et al. (41) noted that risk factors reported in the international literature include psychopathology, prior suicide attempts, sexual orientation, biological factors, family history of suicidal behavior, parental psychopathology, parental divorce, past physical and sexual abuse, stressful life events, and school or work problems. In the current study, school problems were the second most cited stressful condition among adolescents. Thus, support from family and school systems to resolve academic stress among adolescents in Turkey should be strengthened immediately.

In the medical literature, male adolescents have been reported to be more likely to use more violent methods of suicide, such as a firearm or hanging; conversely, drug overdose has been shown to be favored mostly by female adolescents (49). In our study, the predominant method for suicide attempts was self-poisoning, including drug overdose, while most of the subjects were female. In our hospital, traumatic and nontraumatic injuries are admitted to the Emergency Department of General Surgery. Therefore, we could not evaluate the rate of adolescents using violent methods to attempt suicide.

#### *Scales*

Several different scales are used to evaluate suicidal behavior among adolescents. Tatman et al. (11) examined the utility of the SPS by comparing the results obtained from 217 normal adolescents to the findings of Cull and Gill's (15) standardization efforts. Tatman et al.'s sample scored significantly higher than the normative sample on SPS items, subscales, and total scores. In this study, we used 4 different scales: the SPS, RFLI, IRS, and PSI. The SPS was correlated with the others, and the total SPS scores were higher compared with the normal population.

The "reasons for living" concept has been shown to be an important cognitive factor that plays a role in suicidal behavior among adolescents (12). Some similar studies from Turkey exist (19,50). In the current study, we evaluated the subscales of the RFLI and found that "survival and coping beliefs" and "responsibility to others" reduced the risk of suicide.

However, “moral and religious obstacles” and “fear of death” had no effect on suicidal thoughts. Correlation analyses showed that expected relationships and significant coefficients were observed between points of the SPS and RFLI scales, consistent with the literature.

Here we also used a culturally adapted form of the IRS to evaluate the interpersonal relationships of adolescents. Eskin (51) reported that the results of his study clearly support the use of a Turkish version of the IRS as a reliable method for assessing suicide risk. In our study, when correlated with the SPS, suicide probability increased while the “nourishing subscale” of the IRS decreased, and the opposite was true for the “emotionally toxic subscale” of the same scale.

Numerous studies have indicated that problem-solving ability is related to suicidal behavior. For example, Eskin et al. (44) and Speckens et al. (13) showed that adolescents with a history of attempting suicide had poorer problem-solving abilities than those who did not attempt suicide. When examining the relationship between the problem-solving ability level and suicidal behavior, our findings clearly showed that if an adolescent has low problem-solving abilities, the risk of suicidal behavior increases.

#### *Study limitations*

Some limitations to our study must be acknowledged. Our study population included only adolescent suicide attempters who visited the Pediatric Emergency Service and did not include those who used a violent suicidal method, as traumatic and nontraumatic injuries are admitted to the Emergency Service of General Surgery at our hospital. Most of our subjects were female adolescents.

The report of the prevalence of depression among parents may be a low figure given the worldwide estimates. We would like to comment that the reported prevalence of depression among parents may be much lower than that of real prevalence.

Moreover, it was not possible to include all of the self-poisoned adolescents who visited the hospital during the study period, as some did not receive an assessment, and the scales were not completed for all those who were assessed.

This was a cross-sectional study. We cannot know the exact situation of subjects who were not contacted after discharge. They may be in remission, being cared for at another hospital, or dead after a successful suicide attempt. Thus, we cannot speculate on the actual outcome of hospitalized suicide attempters after discharge or identify the most serious risk factors for successful suicide. Long-term follow-up of the subjects would provide more accurate data.

Bias may be another limitation because of the self-report nature of the study. Assessment of multiple source data (parents and teacher) would be more valuable.

#### *Power of the study*

This study is the first one assessing 4 valid scales, the SPS with the RFLI, IRS, and PSI, in suicidal attempters. It was shown that a team approach to cases of suicidal attempt improved recognition and reporting process. The topic of this study is important as suicidal behavior and suicide is a major public health problem in Turkey.

Further studies, including other variables related to the concept of suicide risk, are needed.

#### *Conclusion*

The greater the Suicide Probability Scale score, the higher the probability of suicide and the lower the problem-solving capability. It is possible that having a previous suicide attempt is the most important risk factor for a future suicide attempt. Cooperation among family, school, and psychological professionals may help reduce the attempted suicide rate, especially among female adolescents.

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